CHARGE NUMBER:	1901
PROJECT TITLE:	BIOCHEMICAL MODIFICATION OF TOBACCO
PERIOD COVERED:	March 1-31, 1977
PROJECT LEADER:	D. M. Teng
DATE OF REPORT:	March 31, 1977

I. NITRATE REDUCTION[1]

A proposal was prepared to study the feasibility of applying microbiological nitrate reducing systems to the RL process for the reduction of oxides of nitrogen in smoke generated from this sheet material. This proposal was approved.

The study will include the selection of suitable microorganisms, determination of their growth kinetics, selection of growth media and the optimization of necessary conditions. When a suitable system is established, it will be applied to the RL process to determine the feasibility of applying this system to reduce oxides of nitrogen in the smoke of treated materials.

A bench scale fermenter and ancillary hardware has been ordered and should be delivered in 8-10 weeks.

De-nitrification microorganisms have been ordered from the American Type Culture Collection.

A study is under way to investigate the analytical methods to be used in this study. The primary goal is to establish simple and reliable methods to determine nitrate and its metabolic intermediates when a pure nitrate system is used. Nitrate can be determined by a nitrate electrode. When the nitrate concentration is high or the nitrate concentration is larger than the nitrite concentration a direct reading of nitrate can be done with the electrode without any correction required. Survey of analytical methods for nitrate (besides the nitrate electrode method) and other intermediates is in progress.

II. TREATMENT OF BURLEY STEM WITH CELLULASE[2,3]

Trichoderma viride cellulase was used to treat burley stem materials. Following results were observed.

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1) Reducing sugars can be produced from hammer-milled burley stem in reasonable quantity (20% conversion).

2) Further ballmilling of the material to 40-mesh particle size increases the conversion to 30%. Further milling to smaller sizes has no additional effect on the rate of conversion.

3) A 24-hour fermentation produces about 70% of the sugars found in a 48-hour fermentation.

4) The maximum cellulose degradation occurs at a slurry concentration of 1.5% whereas the maximum sugar formation per unit enzyme occurs at a slurry concentration of 15%.

Additional experiments are either planned or are in progress to determine time and temperature of fermentation of burley stem and RL base web pulp to yield chemically and subjectively superior products.

III. POLYGALACTURONASE PURIFICATION[4]

Three different methods were tried in the purification of commercial pectinase. Pectin methylsterase could not be isolated from polygalacturonase. Other purification methods are under investigation.

IV. REFERENCES

1. D. Teng/B. Semp, Notebook 7121.

2. B. Semp, Notebook 6862.

3. S. Tenhet, Notebook 6827.

4. G. E. Morris, Notebook 6883.

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